

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
John P. Maye et al.

Application No.: 09/520,004

Confirmation No.: 7731

Filed: March 6, 2000

Art Unit: 1794

For: PROCESS FOR CONTROLLING MICRO-
ORGANISMS IN AN AQUEOUS PROCESS
MEDIUM

Examiner: V. Stullii

REPLY BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is filed in accordance with 37 CFR 41.37, 37 CFR 41.41, and 37 CFR 41.43. An Appeal Brief was filed on March 9, 2011, and an Examiner's Answer was mailed on May 24, 2011. This Brief is timely filed.

REPLY BRIEF FEE

No fee is believed to be due. However, if for any reason a fee is required, the Commissioner is hereby authorized and requested to charge Deposit Account No. **04-1105**.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

- I. Real Party In Interest
- II Related Appeals and Interferences
- III. Status of Claims

IV.	Status of Amendments
V.	Summary of Claimed Subject Matter
VI.	Grounds of Rejection to be Reviewed on Appeal
VII.	Argument
VIII.	Claims
Appendix A	Claims
Appendix B	Evidence –Alcohol Distillers Handbook, pp. 172 and 182
Appendix C	Related Proceedings

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is John I. Haas, Inc. The assignment of the invention to this corporation was recorded on December 15, 2006, at Reel/Frame 018638/0925.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 19 claims pending in the application.

B. Current Status of Claims

1. Claims canceled: 1, 19
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 2-18, 20, 21
4. Claims allowed: none
5. Claims rejected: 2-18, 20, 21

C. Claims On Appeal

The claims on appeal are claims 2-18, 20, and 21

IV. STATUS OF AMENDMENTS

No amendments have been filed after issuance of the Final Office Action mailed on November 9, 2010, the Appeal Brief filed on March 9, 2011, and the Examiner's Answer mailed on May 24, 2011.

There are no unentered Amendments. A clean set of the claims on appeal is set forth in Appendix A.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claims 2 and 14 are pending and under examination in the application. Dependent claims 3-13, 15-18, 20 and 21 are also pending and under examination.

Independent claim 2 is directed to an improved process for inhibiting bacterial growth in an aqueous process medium comprising adding a hop acid, characterized in, that the process comprises:

- (a) dissolving the hop acid in an aqueous alkaline medium to form an aqueous alkaline hop acid solution;
- (b) combining the aqueous alkaline hop acid solution with yeast in a yeast growing tank wherein yeast growing is allowed to proceed under aerobic conditions to form a yeast/aqueous alkaline hop acid mixture,
- (c) continuously adding an effective amount of the aqueous alkaline hop acid solution, pre fermentation, to a fermentation process medium in a fermentation tank, wherein the pH of the aqueous alkaline hop acid solution is higher than the pH of the aqueous process medium; and
- (d) introducing the yeast/aqueous alkaline hop acid mixture of step (b) into the fermentation process medium of step (c) and allowing for fermentation to occur under anaerobic conditions.

Support for the claim can be found in the specification and claims as originally filed, e.g., original claims 1, 2 and 12; Figure 1; Figure 2; page 4, line 12 to page 5, line 2; and Example 5.

Independent claim 14 is directed to an improved process for inhibiting bacterial growth in a distillery comprising:

- (a) contacting a fermentable solution with an effective antibacterial amount of an isomerized alkaline hop acid solution or derivative thereof, to form an aqueous alkaline hop acid fermentable solution;
 - (b) adding the aqueous alkaline hop acid fermentable solution of step (a) to a yeast growing tank comprising yeast, and allowing yeast growing to proceed under aerobic conditions;
- and
- (c) adding the contents in the yeast growing tank of step (b) to a fermentor tank, wherein fermentation is allowed to proceed under anaerobic conditions.

Support for the claim can be found in the specification and claims as originally filed, e.g., original claim 14, Figure 1; Figure 2; page 4, line 12 to page 5, line 6; page 11, lines 12-16; and Example 5.

Dependent claims 3-13, 15-18, 20 and 21 recite additional features of the claimed processes.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON

The issues on Appeal as to the rejection, or the grounds of rejection to be reviewed on appeal, are:

1. Whether claims 2-6, 8-11, 14, 15, 20 and 21 are obvious within the meaning of 35 USC §103(a) over Todd et al. (US 5,082,975) in view of Alcohol Distillers Handbook ("HANDBOOK"), Righelato et al. (Phil. Trans. R. Soc. Lond. B 290, (1980), 303-312) and Richards et al. (Plant Physiology, 1932, 7(1), 139-144).
2. Whether claims 7 and 16-18 are obvious within the meaning of 35 U.S.C. §103(a) over Todd et al. (US 5,082,975) in view of Alcohol Distillers Handbook ("HANDBOOK"), Righelato et al. (Phil. Trans. R. Soc. Lond. B 290, (1980), 303-312) and Richards et al. (Plant Physiology, 1932, 7(1), 139-144), and further in view of Simpson (J. Inst. Brew., 1987, 93, 405-406).
3. Whether claims 12 and 13 are obvious within the meaning of 35 U.S.C. §103 (a) over Todd et al. (US 5,082,975) in view of Alcohol Distillers Handbook ("HANDBOOK"), Righelato et al. (Phil. Trans. R. Soc. Lond. B 290, (1980), 303-312) and Richards et al. (Plant Physiology, 1932, 7(1), 139-144), Simpson (J. Inst. Brew., 1987, 93, 405-406), and further in view of US 4,002,863 (herein referred to as "Todd 2").
4. Whether the provisional rejection of claims 2-18, 20, and 21 under obviousness-type double patenting in view of claims 41 and 43-47 of copending US Patent Application No. 11/473,533 and in view of claims 34-40 of copending US Patent Application No. 10/361,976 should be withdrawn.

VII. ARGUMENT

Arguments regarding the above “grounds of rejection” (section VI) were discussed in the Appeal Brief filed on March 9, 2011. Below, Applicants hereby present examples of clear errors and/or misinterpretations by the Examiner found in the Examiner’s Answer mailed on May 24, 2011.

1. APPELLANTS BELIEVE THAT THE EXAMINER HAS COMBINED THREE MISINTERPRETATIONS OF THE CITED REFERENCES TO INCORRECTLY ARRIVE AT THE APPELLANTS’ CLAIMS, AS STATED IN THE EXAMINER’S ANSWER AT PAGE 15, LINES 11-12, PAGE 15, LINES 20-21, AND PAGE 16, LINES 6-9.

Appellants disagree with the following statements by the Examiner:

Applicant’s invention is not directed to the method of growing yeast.

...it was well known in the art to use hop acids (resins) extracts for preparation of yeast fermentaion mashes in alcohol (ethanol) production...

One of ordinary skill in the art would have been motivated to add hop acids solutions to the yeast growing tank, and then to transfer the mixture to the fermentation vessel, since Todd, Jr. et al. disclose “the addition of hexahydrolupulone to a yeast culture to inhibit the growth of Lactobacillus therein”.

- Appellants contend the step of yeast propagation, which clearly takes place under aerobic conditions pre-fermentation, in the presence of aqueous alkaline hop acid solution, is a critical embodiment of the claimed subject matter (see claim 2).
- Appellants contend that the instant claims are directed towards a method of using an aqueous alkaline solution of hop acids, not hop (resins) extracts. The Examiner

appears to believe that an aqueous alkaline solution of hop acids can be substituted by hop (resins) extracts. However, the two are clearly distinct and thus are not interchangeable in the methods of the Appellants' invention (as evidenced by 1. Simpson, which teaches that hop resins are ineffective in controlling lactobacillus LA and LX; (see Appellants' Appeal Brief at pages 7 and 9-10); and 2. Handbook, wherein the Examiner has mischaracterized the term "yeast mash," which in Handbook refers to a food for yeast and does not describe any yeast propagation (see Appellants' Appeal Brief at page 9-11).

- Appellants contend that the only mention of yeast in Todd is found at column 8, lines 3-8, which teaches anaerobic fermentation ("in the brewhouse") in the presence of hexahydrolupulone. Appellants wish to re-emphasize that the currently pending claims include a yeast propagation step, which is not taught or suggested by Todd. As yeast propagation is not disclosed by Todd, Appellants further contend that no reasonable expectation of success to arrive at the Appellants' claims can be assumed based on Todd.
- The Examiner has incorrectly arrived at the Appellants' claims based on impermissible hindsight and misinterpretation of the cited references. That is, (i) failure to accurately recognize the yeast propagation claim element; (ii) failure to recognize the distinctions between hop resins and aqueous alkaline hop acid solutions; and (iii) asserting a reading of Todd that is out of context; each alone or in combination is error that fails to support the conclusion that Todd and/or Simpson render Appellants' claims obvious. Appellants submit that the rejection is overcome and respectfully request withdrawal of the rejection.

**2. APPELLANTS BELIEVE THAT THE EXAMINER HAS INCORRECTLY
CHARACTERIZED THE USE OF YEAST IN THE EXAMINER'S ANSWER AT PAGE
7, LINES 3-7**

Appellants disagree with the following statement by the Examiner (shown verbatim to original text, errors uncorrected):

In regard to the isomerized form of hop acids recited in claims 14 and 125, Todd discloses that use of isomerized hop acids was a well known practice in the art (Col. 1 lines 25-30). One of ordinary skill in the art would have been motivated to use hexahydrolupulon in the isomerized form as a well known hop acid material used in the fermentation process involving the presence of yeast.

- Appellants contend that none of Examples 1-6 in Todd include yeast. In fact, the only mention of yeast in Todd is found at column 8, lines 3-8, which teaches anaerobic fermentation in the presence of hexahydrolupulone. Appellants wish to re-emphasize that the currently pending claims include a yeast propagation step, which is not taught or suggested by Todd. As yeast propagation is not disclosed by Todd, Appellants further contend that no reasonable expectation of success to arrive at the Appellants' claims can be assumed based on Todd.
- Appellants further contend that an isomerized form of hexahydrolupulone is not chemically possible. The Examiner's statement regarding isomerization is scientifically not possible. Todd's invention teaches a process of producing hexahydrolupulone which is a non-isomerized hop acid. In fact Todd adjusts the reaction conditions employed by Worden (Col. 1, lines 25-30) to provide a new process for the production of hexahydrolupulone; an end product that's chemically distinct from the end compound generated by Worden's process. Appellants wish to emphasize that Todd's invention only claims a production process and his teachings are unrelated to Appellant's claims (particularly in lacking a yeast propagation teaching). Appellants submit that the rejection is overcome and respectfully request withdrawal of the rejection.

**3. APPELLANTS BELIEVE THAT THE EXAMINER HAS INCORRECTLY
CHARACTERIZED THE YEAST PRODUCTION PROCESS IN THE EXAMINER'S
ANSWER AT PAGE 8, LINES 11-13**

Appellants wish to clarify the following statement by the Examiner:

Todd, Jr, et al. do not disclose that the aqueous alkaline hop acid solution contains from about 2 to about 40 wt. % of hop acid, the aqueous process medium is a process medium in a yeast production process.

- Appellants agree with the Examiner that: 1. Todd does **not** disclose that the aqueous alkaline hop acid solution contains from about 2 to about 40 wt. % of hop acid; and 2. Todd does **not** disclose the aqueous process medium is a process medium in a yeast production process.
- If the Examiner's text is interpreted to mean that Todd does disclose that the aqueous process medium is a process medium in a yeast production process, Appellants disagree. In fact, the Examiner, at page 8, lines 21-22, clearly states that "Todd, Jr. et al. is silent as to the addition of hop acid solution to yeast in a yeast growing tank.", which contradicts such an interpretation of the text.
- The Examiner then proceeds to use Handbook to show that hops extract is used to prepare yeast mashes. As an initial matter, Appellants note that HANDBOOK provides for a hop resin extract, not an aqueous alkaline solution of hop acids, which is distinct and distinguishable from hop resin extracts. Further, Handbook is not relevant for the reasons discussed in the Appellants' Appeal Brief, at page 10, line 16 to page 11, line 2, and page 11, line 8 to page 12, line 31. Thus, the application of Handbook to bridge the deficiencies of Todd fails for at least: (i) lack of a teaching in Handbook of a yeast propagation step (pre-fermentation) with aqueous alkaline solutions of hop acids (a recited element of Appellants' claims); (ii) the asserted teaching of Handbook is **contrary** to the teachings of Simpson, that is, Handbook teaches it is "believed" that hop resin extracts inhibit growth of microorganisms yet

Simpson presents data showing that hop resins are **ineffective** in controlling lactobacillus LA and LX; (iii) the teachings of Handbook show that lactobacillus is added to hop resins, assuming bacteria will grow to create the sour note desired; thus providing a showing that hop resins do not inhibit bacteria, and that Handbook is propagating bacteria, NOT yeast; and (iv) lack of reasonable expectation of success based on the aqueous alkaline hop acid solution / hop resin extract distinction including the contrary Simpson teachings, which at a minimum would call into question the expectation of success of a skilled practitioner. Thus the cited art combination fails to render (with any reasonable expectation of success) Appellants' claims obvious. Appellants submit that the rejection is overcome and respectfully request withdrawal of the rejection.

4. APPELLANTS BELIEVE THAT THE EXAMINER HAS INCORRECTLY INTERPRETED THE METHOD STEPS OF BACTERIAL INHIBITION IN FUEL ETHANOL IN THE EXAMINER'S ANSWER AT PAGE 9, LINES 6-9, AND AT PAGE 9, LINES 13-16

Appellants disagree with the following statements by the Examiner:

One of ordinary skill in the art would have been motivated to modify disclosure of Todd, Jr. et al and to use hop acids extract in ethanol (alcohol) production at any stage of the ethanol production where inhibiting of bacteria is required.

One of ordinary skill in the art would have been motivated to add hop acids solutions to the yeast growing tank, and then to transfer the mixture to the fermentation vessel...

- Appellants submit that the conclusions reached by the Examiner are not supported by the references cited, and believe the Examiner has incorrectly arrived at the Appellants' claims based on an overly broad interpretation of the fermentation process, based on Todd and Handbook. Specifically, Applicants contend that neither Todd nor Handbook or a combination thereof, provides any teaching or

motivation to apply an alkaline solution of hop acids to a yeast propagation step, as is recited in Appellants' claims. Applicants further contend that Todd, Handbook, or a combination thereof, does not provide any indication that yeast propagation is part of a process for inhibiting bacterial growth in an aqueous process medium. The Examiner has incorrectly arrived at the Appellants' claims based on impermissible hindsight and misinterpretation of the cited references. Appellants submit that the rejection is overcome and respectfully request withdrawal of the rejection.

5. APPELLANTS BELIEVE THAT THE EXAMINER HAS INCORRECTLY INTERPRETED THE YEAST PROPAGATION AND FERMENTATION METHOD STEPS IN THE APPELLANTS' CLAIMS, AS STATED IN THE EXAMINER'S ANSWER AT PAGE 14, LINES 4-6, AND PAGE 14, LINES 17-19

Appellants disagree with the following statements by the Examiner:

The aerobic/anaerobic conditions have nothing to do with the addition of hexahydrolupulone to a yeast culture to inhibit the growth of *Lactobacillus*.

Therefore, one of ordinary skill in the art would have been motivated to modify Todd and to employ conventional conditions for alcohol fermentation and yeast growth such as aerobic for yeast growth and anaerobic for fermentation.

- Appellants contend that the differences in the yeast propagation step and the fermentation step, as recited in Appellants' claims, are distinguished by aerobic or anaerobic conditions. On the contrary, the distinct steps (propagation and fermentation) and their respective inherent differences are a distinguishable feature that is not taught by the art and results in superior performance over the art. As stated in the Appeal Brief, Appellants' claims include a method step wherein an aqueous alkaline hop acid solution and yeast are added into a yeast growing tank under aerobic conditions. Under such aerobic reaction conditions, those of ordinary

skill in the art would undoubtedly realize that yeast will be growing and fermentation will be minimized due to the aerobic conditions. This separate step is clearly not contemplated by Todd.

- Further, Appellants contend that the deficiencies of Todd are not corrected by Richards or Righelato, and believe the Examiner has used impermissible hindsight to combine Todd with Richards or Righelato, both of which provide very general teachings which are clearly known to those of ordinary skill in the art, in rejecting the Appellants' claims. Appellants submit that the rejection is overcome and respectfully request withdrawal of the rejection.

6. APPELLANTS BELIEVE THAT THE EXAMINER HAS INCORRECTLY INTERPRETED THE USE OF HOP ACIDS IN BREWERY YEAST SLURRIES, AS STATED IN THE EXAMINER'S ANSWER AT PAGE 15, LINES 2-4

Appellants disagree with the following statements by the Examiner:

Simpson discloses that hop acids present in the brewery yeast slurries have a bacterial action on lactic acid bacteria during the acid washing process.

Appellants contend that Simpson is directed towards a post-fermentation process of cleaning yeast. Specifically, the hop acids in Simpson are viewed as a contaminant of **spent** yeast, which are then washed with water to remove the hop acids. Subsequently, the spent yeast is washed with acid to remove contaminant bacteria, which is then transferred to the fermentor. Thus, Simpson describes a method of washing yeast with acid to control lactic acid bacteria, and is not related to yeast propagation. Appellants contend that the washing of yeast of Simpson cannot be extrapolated to any of the steps of the Appellants' claims (e.g., yeast propagation and fermentation). Appellants submit that the rejection is overcome and respectfully request withdrawal of the rejection.

VII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by the Applicant on September 2, 2010.

CONCLUSION

For at least the foregoing reasons, Appellants contend that the rejections of record should be withdrawn, and that the present application is in condition for allowance. Early and favorable consideration of the application is earnestly solicited.

The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105, under Order No. 61755 (51035).

Dated: 25 July 2011

Respectfully submitted,

By: /Dwight D. Kim/

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 09/520,004

Claim 1 (canceled)

Claim 2 (Previously presented): An improved process for inhibiting bacterial growth in an aqueous process medium comprising adding a hop acid, characterized in, that the process comprises:

- (a) dissolving the hop acid in an aqueous alkaline medium to form an aqueous alkaline hop acid solution;
- (b) combining the aqueous alkaline hop acid solution with yeast in a yeast growing tank wherein yeast growing is allowed to proceed under aerobic conditions to form a yeast/aqueous alkaline hop acid mixture,
- (c) continuously adding an effective amount of the aqueous alkaline hop acid solution, pre fermentation, to a fermentation process medium in a fermentation tank, wherein the pH of the aqueous alkaline hop acid solution is higher than the pH of the aqueous process medium; and
- (d) introducing the yeast/aqueous alkaline hop acid mixture of step (b) into the fermentation process medium of step (c) and allowing for fermentation to occur under anaerobic conditions.

Claim 3 (Previously presented): A process according to claim 2, wherein the aqueous alkaline hop acid solution contains from about 2 to about 40 wt. % of hop acid.

Claim 4 (Previously presented): A process according to claim 2, wherein the pH of the aqueous alkaline hop acid solution ranges from about 7.5 to about 13.0.

Claim 5 (Previously presented): A process according to claim 2, wherein the hop acid is a natural hop acid or derivative thereof; an isomerized hop acid or derivative thereof; or mixtures thereof.

Claim 6 (Original): A process according to claim 5, wherein the natural hop acid or derivative thereof is alpha acid, beta acid, tetrahydroalpha acid, hexahydrobeta acid, or mixtures thereof.

Claim 7 (Original): A process according to claim 5, wherein the isomerized hop acid or derivative thereof is isoalpha acid, rhoisoalpha acid, hexahydroisoalpha acid, or mixtures thereof.

Claim 8 (Previously presented): A process according to claim 2, wherein the aqueous alkaline medium comprises from about 1 to about 5 wt. % of potassium hydroxide, sodium hydroxide or mixtures of potassium hydroxide and sodium hydroxide.

Claim 9 (Previously presented): A process according to claim 2, wherein the temperature of the aqueous process medium is lower than 100° C.

Claim 10 (Previously presented): A process according to claim 2, wherein the concentrations of the hop acid within the aqueous process medium is in the range of 0.1 - 50 ppm.

Claim 11 (Previously presented): A process according to claim 2, wherein the aqueous process medium is a process medium in a yeast production process.

Claim 12 (Previously presented): A process according to claim 2, wherein the aqueous alkaline hop acid solution is prepared according to the following process:

- a. heating an aqueous medium;
- b. adding a hop acid to the heated aqueous medium of step (a) to form a solution wherein a final concentration of the hop acid is within a predefined range of concentration;
- c. adding an alkali metal hydroxide to a second aqueous medium to obtain a solution having a pre-defined pH;

- d. mixing the alkaline medium from step (c) with the hop acid aqueous medium from step (b);
- e. keeping the mixture from step (d) in a temperature range used in step (a) within a pre-defined time period;
- f. separating a solution of hop acid from the mixture of step (e); and
- g. cooling the solution of hop acid from step (f) to a temperature below about 20° C.

Claim 13 (Previously presented): A process according to claim 12, wherein the aqueous alkaline hop acid solution is cooled to a temperature below 10° C.

Claim 14 (Previously presented): An improved process for inhibiting bacterial growth in a distillery comprising:

(a) contacting a fermentable solution with an effective antibacterial amount of an isomerized alkaline hop acid solution or derivative thereof, to form an aqueous alkaline hop acid fermentable solution;

(b) adding the aqueous alkaline hop acid fermentable solution of step (a) to a yeast growing tank comprising yeast, and allowing yeast growing to proceed under aerobic conditions;

and

(c) adding the contents in the yeast growing tank of step (b) to a fermentor tank, wherein fermentation is allowed to proceed under anaerobic conditions.

Claim 15 (Original): A process according to claim 14 wherein, the isomerized hop acid or derivative thereof is isoalpha acid, rhoisoalpha acid, tetrahydroisoalpha acid, hexahydroisoalpha acid, or mixtures thereof.

Claim 16 (Previously presented): A process according to claim 14 wherein, the fermentable solution is stored as a concentrate and diluted with water prior to the addition of the isomerized alkaline hop acid in step (a).

Claim 17 (Previously presented): A process according to claim 16 wherein, the pH of the isomerized alkaline hop acid solution is greater than the pH of the fermentable solution .

Claim 18 (Previously presented): A process according to claim 14 wherein, the concentration of isomerized alkaline hop acid or derivative thereof in the alkaline hop acid fermentable solution ranges from about 1 to about 20 ppm.

Claim 19 (Canceled).

Claim 20 (Previously presented) A process according to claim 14, wherein the addition of the alkaline hop acid fermentable solution in step (b) occurs at a temperature of less than about 30° C.

Claim 21 (Previously presented): A process according to claim 2, wherein the temperature of the aqueous process medium is lower than 30° C.

APPENDIX B

ALCOHOL DISTILLERS HANDBOOK (HANDBOOK), pp. 172 AND 182

APPENDIX C

There are no related proceedings with respect to section II. above, hence copies of decisions in related proceedings are not provided.